Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte CHRISTOPHER J. NAGEL,
THOMAS P. GRIFFIN,
THOMAS A. KINNEY and
KEVIN A. SPARKS

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Appeal No. 1997-0159
Application 08/172,579

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ON BRIEF

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Before JOHN D. SMITH, OWENS, and SPIEGEL, Administrative Patent Judges.

JOHN D. SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal pursuant to 35 U.S.C. § 134 from the final rejection of claims 1 through 15, 26 and 27.

Claim 1 is representative and is reproduced below:

1. A method for reforming hydrocarbons into shorter-chain unsaturated organic compounds, comprising the steps of:

a) providing a molten metal bath, said molten metal bath consisting essentially of an elemental metal which can cause cleavage of at least one carbon-carbon bond of a hydrocarbon component of a hydrocarbon-containing feed;

b) directing said feed into the molten metal bath at a rate which causes the concentration of carbon in the molten metal bath to be lower than the saturation limit for carbon of said bath at the operating conditions of said molten metal bath, whereby the hydrocarbon component of the feed can exhibit cleavage of at least one carbon-carbon bond of the hydrocarbon component of said feed; and

c) establishing and maintaining conditions in said molten metal bath to cause cleavage of at least one carbon-carbon bond of the hydrocarbon component to produce unsaturated organic compounds, as products of said cleavage.

The sole reference now relied upon by the examiner is:

Nagel 5,191,154 Mar. 2, 1993

The appealed claims stand finally rejected under 35 U.S.C. § 103 as unpatentable over Nagel. See the Examiner's Answer at page 3 and the final rejection entered on May 1, 1995 as Paper No. 10.

We reverse.

The subject matter on appeal relates to a method for reforming hydrocarbons into shorter-chain unsaturated organic compounds, such as ethylene. Reforming of hydrocarbons is a defined process which involves the decomposition or cracking of hydrocarbon gases or low-octane petroleum fractions by heat and pressure either with or without a catalyst. See The Condensed Chemical Dictionary, 10th Edition, edited by Hawley, copyright 1981 at pages 886 and 887, copy attached. Appellants' claimed reforming method involves the steps of providing a molten metal bath of an elemental metal which is capable of causing cleavage of at least one carbon-carbon bond of hydrocarbon component of a hydrocarbon-containing feed. The feed is directed into the molten metal bath at a rate which causes the concentration of carbon in the

molten metal bath to be lower than the saturation limit for carbon of the bath at the operating conditions of the molten metal bath. See step (b) of appealed claim 1. Significantly, as set forth in the preamble of appealed claim 1 and specifically in step (c), conditions are established and maintained in the molten metal bath to cause cleavage of at least one carbon-carbon bond of the hydrocarbon component of the feed to produce unsaturated organic compounds as products of the cleavage of appellants' reforming process.

As evidence of obviousness of the herein claimed invention, the examiner relies on Nagel. The examiner correctly ascertained that Nagel teaches a process for decomposing various organic compounds including hydrocarbons by contact with a molten metal bath comprising metals. The examiner acknowledges, however, that Nagel does not disclose that any unsaturated organic compounds are produced in any reaction described or suggested in Nagel. However, the examiner contends that it would have been obvious to a person of ordinary skill in this art to "optimize the reaction conditions so as to maximize the desired effluent by routine experimentation." See pages 3 and 4 of the final rejection entered as Paper No. 10.

As pointed out in appellants' Brief, the examiner's stated rejection is problematical in a number of aspects. First, unlike the presently claimed invention which is directed to a reforming process, Nagel contains no disclosure of reforming hydrocarbon feedstreams. Indeed, Nagel's method is specifically disclosed as useful for dealing with hazardous waste

including organic materials, and Nagel is concerned with prior art problems relating to the disposal of such waste wherein reactors release gases which must be either contained or destroyed. See Nagel at column 1, lines 38 through 42. Thus, the basic thrust of the Nagel invention is to provide a process to convert waste materials into atomic constituents and to form relatively stable compounds for disposal purposes. See Nagel at column 3, lines 1 through 8 and lines 37 through 42. Accordingly, while it might have been obvious to a person of ordinary skill in this art to "optimize the Nagel reaction conditions" so as to "maximize the desired effluent by routine experimentation," as alleged by the examiner, Nagel's "desired effluent" is not a shorter-chain unsaturated organic compound as required by the appealed reforming method, but a stable compound which can be disposed of. Moreover, because Nagel is not directed to a reforming process, Nagel necessarily fails to disclose the establishment and maintenance of reaction conditions to produce unsaturated organic compounds as required by step c) of appellants' claimed method. Accordingly, the examiner's stated obviousness rejection cannot be sustained.

The decision of the examiner is reversed.

John D. Smith)
Administrative Patent Judge)
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Terry J. Owens) BOARD OF PATENT
Administrative Patent Judge) APPEALS AND
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